

# **ORVR Penetration Calculations**

July, 1998

The ARB staff has revised estimates of the future percentage of vehicle miles traveled by vehicles equipped with onboard refueling vapor recovery (ORVR). This document presents the estimated percentages for various years and describes how the estimate was made.

The basis of the estimate is the mandated phase-in schedule for ORVR vehicles (see Table 1) and an age profile for autos and light duty trucks prepared in connection with the annual update of the "100-Car Matrix" used in testing vapor recovery systems at gasoline stations. This age profile was prepared using (1) figures for vehicle miles traveled for vehicles of various vintages and the ratio of light trucks to autos for various vintages obtained from ARB's Technical Services Division, and (2) an annual report from the California Department of Motor Vehicles itemizing auto populations by age and make. The age profile for vehicle miles traveled per day as of January 1, 1998 is shown in Table 2.

The estimate of the future overall percentage of vehicle miles traveled by vehicles equipped with ORVR was made assuming the age profile in Table 2 prevailed over the estimating period and that ORVR-equipped vehicles would enter the population at the mandated times and in the mandated proportions. The estimated percentage of vehicle miles traveled by ORVR-equipped vehicles is shown in Table 3.

A number of assumptions affect the reliability of the values in Table 3. These include the following:

1. Introduction of ORVR vehicles into the market is assumed to follow the phase-in schedule given in Table 1. Earlier introduction of ORVR vehicles is not prohibited by regulations and could accelerate ORVR penetration.
2. The age profile for vehicles shown in Table 2 is assumed to be reasonable and correct as of January 1, 1998 and is further assumed to be applicable to future years in which ORVR percentages are estimated. This ignores any possible future changes in buying and driving habits and also ignores the effect of programs intended to take older vehicles off the road and encourage use of electric and alternate-fuel vehicles.
3. Trucks in the "Medium Duty Truck" category and heavier are ignored. Medium Duty Trucks are believed to be only about 5% of the population and their mandated schedule for ORVR begins in 2004. This assumption may result in a slight acceleration of the estimated ORVR penetration compared to real values.
4. The difference in fuel economy (miles per gallon) between trucks and autos is ignored. Higher fuel consumption in trucks (which have later scheduled ORVR phase-in) will make the percentage of gasoline consumed by ORVR-equipped vehicles lag the estimated ORVR percentage penetration calculated in terms of vehicle miles traveled.

**Table 1 - Mandated Phase-In Schedule for ORVR on Autos and Light Duty Trucks**

1998 model year - 40% of Autos must have ORVR  
 1999 model year - 80% of Autos must have ORVR  
 2000 model year and thereafter - 100% of Autos must have ORVR  
 2001 model year - 40% of Light Duty Trucks\* must have ORVR  
 2002 model year - 80% of Light Duty Trucks\* must have ORVR  
 2003 model year and thereafter - 100% of Light Duty Trucks\* must have ORVR

\* "Light Duty Trucks" have GVW up to 6000 pounds and include most pickup trucks.

**Table 2 - Age Profile for Vehicle Miles Traveled for Autos and Light Duty Trucks**

<u>Miles Traveled/day</u>			<u>Miles Traveled/day</u>		
<u>age</u>	<u>autos</u>	<u>trucks</u>	<u>age</u>	<u>autos</u>	<u>trucks</u>
0*	13503947*	6838062*	26	6272032	2151655
1	67927646	34147570	27	4627699	1587558
2	61693916	30464226	28	4353183	1493384
3	67788806	32373179	29	4224097	1449100
4	59583172	27578466	30	3326091	1141034
5	56772294	24608990	31	2922842	1002697
6	45332168	17828140	32	2679663	919273
7	49923190	16702786	33	2793202	958223
8	47578704	19224822	34	1842046	631924
9	50917003	22176728	35	1297235	445024
10	51926978	22929163	36	905035	310477
11	42990215	16121225	37	563906	193451
12	40145406	13874302	38	580469	199133
13	34288693	12143121	39	533939	183171
14	29273139	11869264	40	370570	127126
15	18106876	8018804	41	630327	216237
16	15302030	6714440	42	602973	206853
17	13539682	5443958	43	548575	188192
18	12676966	4474220	44	281125	96442
19	15238870	4774642	45	284605	97635
20	13553333	4491775	46	194269	66645
21	11488148	4287270	47	232962	79919
22	8360950	4361997			
23	5795769	3153203			
24	7118299	3613300			
25	7500490	4272136			

\* Vehicles in current model year as of January 1; these "new" vehicles have only been on the market since September and represent a low percentage of population and vehicle miles traveled.

Table 3 - Estimated Percentage of Overall Vehicle Miles Traveled by Vehicles Equipped with ORVR (Autos and Light Duty Trucks Only)

<u>Year*</u>	<u>Percent</u>
1998	0.43
1999	3.00
2000	7.32
2001	12.70
2002	19.00
2003	25.91
2004	32.61
2005	38.90
2006	44.86
2007	50.54
2008	56.03
2009	61.26
2010	66.28
2011	71.04
2012	75.28
2013	78.63
2014	81.23
2015	83.40
2016	85.30
2017	87.05
2018	88.67
2019	90.12
2020	91.34

\* Estimated percentages are effective January 1 of the indicated year.

